BULLETIN

of the

ONTARIO COLLEGE OF PHARMACY

Vol. VI, No. 2 TORONTO, Ontario March, 1957
H. J. Fuller, Editor

CONTENTS

		Page
Editorial		23
Message from the Registrar	H. M. Corbett	24
The Pharmacist and the Veterinarian	F. N. Hughes	25
Facts Worth Remembering	G. C. Walker	30
Prescription Pricing and Cost Accounting	H. J. Fuller	31
Chromatography and Ion Exchange	L. N. Elowe	37
Survey of Salaries of Graduates in Ontario	H. J. Fuller	38

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BULLETIN

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Vol. VI, No. 2 | TORONTO, Ontario | March, 1957

H. J. Fuller, Editor

The Ontario College of Pharmacy is the pharmaceutical licensing body for the Province of Ontario, Canada. All pharmacists licensed in Ontario are *IPSO FACTO* members of the College.

The majority of contributors to the Bulletin are members of the Faculty of Pharmacy, University of Toronto. However, contributions are welcomed from all members of the College.

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Editorial

Pharmacy's Need for Economic Research and Analysis was one of the topics discussed by Dr. Troy C. Daniels, Chairman of the House of Delegates of the American Pharmaceutical Association, in his address to the First Interim Meeting of the A. Ph. A. House of delegates, Washington, D.C., November 10, 1956. This complete address is published in the January, 1957 issue of the Journal of the A. Ph. A., Practical Pharmacy Edition, and a portion of it constitutes the editorial in the February, 1957 issue of the **Western Druggist.**

In essence, Dr. Daniels said that:

1. "There is an all too prevalent impression that pharmaceutical services are too costly" and the situation is not improving.

2. Surveys show that "50% or more of prescription medication is supplied at no profit.

3. This "forces the pharmacy practitioner into operational channels outside the area of professional service, and

4. more importantly serves to diminish the inflow of qualified recruits necessary to maintain pharmacy's service at an acceptable level."

5. "The pharmacists by virtue of his education and training is licensed in the interest of public safety for the handling and distribution of drugs, narcotics, and poisons. The license represents a public trust that under no circumstances can be lightly accepted, for it should be remembered that some of our so-called innocuous drugs are responsible for many deaths. In 1955 approximately 350 children died from the accidental ingestion of aspirin. This tragic situation would not exist if all drugs were distributed by pharmacists who were keenly aware of their public responsibility and routinely warned of the hazards that may be involved. *This is a public trust that is manifestly violated by those who delegate the responsibility to non-licensed personnel through the medium of self-service counters. Self-service on drugs is in conflict with the public interest and likewise in conflict with pharmacy's code of ethics."—(editor's italics).*

6. "There is urgent and compelling need for the establishment of a qualified research and fact-finding body for the purpose of developing: accurate statistical information on our cost-and-profit structure; documentary reports and analyses on social and economic trends; an over-all composite view of pharmacy's operation; and for presenting the pertinent information in an acceptable form to all segments of pharmacy and through special articles for public information."

7. The research group should include "the requisite number of full-time economists, accountants, statisticians, and staff writers working under a director who is serving under the jurisdiction of an executive committee or board of directors made up of representatives of all branches of pharmacy."

There is a great deal of material for contemplation in Dr. Daniels' address. In Canada, in our own way, perhaps we have not only already contemplated some of these things but have put some of the ideas into practice. We do have the Canadian Pharmaceutical Associations' Annual Survey of Retail Pharmacy Operations, now in its sixth year under an economist. We do have the Fuller-Stauffer Hospital Pharmacy Survey of 1956 and a second one is now in progress.

What we need most, at the present moment, is the greater cooperation of the pharmacists in the completion of their questionnaires for the 15th Annual Survey of Retail Pharmacy Operations. The information will be vital if any complete Health Insurance Plan should develop.

MESSAGE FROM THE REGISTRAR

During the past month, two very important events have taken place. Since the publication of the January issue of the Bulletin, the College has mailed out, to members, the Minutes of Council, November session. We sincerely hope you have read them, especially the Report of the Health Insurance Committee, beginning on page 1173.

The report which was adopted by Council outlined a plan of action. One item of special importance was the motion, appearing at the end of page 1185, in which Council invited members of other organizations (the Ontario Retail Pharmacists' Association, and the Canadian Pharmaceutical Association) to cooperate with them in this essential work. This enlarged committee met on January 23rd. It was recommended that the new Commitee be known as the "Ontario Pharmacists' Health Services Committee." The recommendations of the Ontario College of Pharmacy were in large measure adopted by the new committee. We think this marks a progressive step in co-ordinating the efforts of the three associations, and Council is to be congratulated on its work.

Open House, planned and executed by the students in the Faculty of Pharmacy, University of Toronto, was held early this week. At this moment we are all experiencing a glow of pride and satisfaction with the event. Almost one thousand visitors came. Students guided them through the building, while other students gave talks and demonstrations. The library was open, with old and new books and periodicals on display. The laboratories were humming with students who showed us the uses of a Geiger counter, the operation of a tabletting machine, and methods of testing and standardizing pharmaceuticals. Guests were given the opportunity of examining drugs under a microscope, and of having their blood typed. Interesting things were happening, from the time the visitors checked their coats until they finished their coffee at the end of the tour. The students were gracious, interested and enthusiastic. They did a magnificent job of promoting pharmacy—in the eyes of the public and also of some of us older pharmacists. We were honoured by visits from many University staff members, including President Smith.

We are especially grateful to the pharmacists of London, Hamilton and Niagara Falls, who brought coach loads of high school students. Pharmacists from other areas filled their cars with potential students and drove long distances—and the weather was not kind. Quite a number of teachers came to see our work, and brought pupils with them. We were delighted to have these visitors, and we believe they enjoyed themselves and profited by the experience.

It would be impossible to name all those who helped—such as the Ladies' Auxiliary to Toronto Pharmacists (who brought cookies and their husbands), the various organizations of local pharmacists—and some not quite so local, the Canadian Foundation for the Advancement of Pharmacy. The Undergraduate Pharmaceutical Society, with Professor Kennedy and Professor Paterson as advisors, have been working on the project for many months. To them goes full credit for the inspiration that produced another successful Open House.

H. M. CORBETT, Registrar-Treasurer.

THE PHARMACIST AND THE VETERINARIAN

It was my privilege on January 25th to present a paper at the Annual Meeting of the Ontario Veterinary Association outlining the respective roles of the pharmacist and the veterinarian in animal health. The paper presented at the time is printed below. It is reproduced herewith in order that the pharmacists of Ontario may be fully aware of the various proposals for closer co-operation made to the veterinarians at that time. It will be of interest to the readers to know that these proposals were received with interest and a good measure of enthusiasm by the veterinary practitioners. As a consequence one is hopeful that there will be individual and possibly association proposals for closer co-operation. If and when such proposals come one would express the hope that the practising pharmacists will make every effort to co-operate fully. As mentioned in the paper our two groups have much to gain by closer co-operation. (Paper delivered at Annual Meeting of Ontario Veterinary Association, January 25, 1957).

When your Chairman, Dr. Mitchell, extended the invitation for me to appear on the programme of this meeting I accepted with alacrity for two very special reasons. First, I deemed it a great honour to have been considered worthy of your confidence. Secondly, it provided an opportunity for me to discuss something which has concerned me greatly — as I know it has likewise concerned others in our two professions — namely the respective roles of the veterinarian and the pharmacist in serving the health needs of the livestock and pets in our communities, both rural and urban.

Let me say at the outset that I am not posing as an expert on interprofessional relations nor, in any sense, on how the veterinarian should practise his profession. But there are, I believe, some fundamental principles and also some basic misconceptions which need to be recognized by our two groups. The recognition of these will not **per se** solve all of the problems, but it will create an atmosphere of understanding in which compromise and co-operation will have an opportunity to flourish.

The so-called health professions include all of those professionally trained groups concerned with public health. We should not confuse "public health" with "medical service". For public health, as defined by Professor C. E. Winslow, is much broader: "Public health is the science and the art of preventing disease, prolonging life, and promoting physical and mental health and efficiency through organized community efforts. They include sanitation of the environment, the control of community infections, the education of the individual in principles of personal hygiene, the organization of medical and nursing service for the early diagnosis and preventive treatment of disease, and the development of the social machinery which will ensure to every individual in the community a standard of living adequate for the maintenance of health."

Unquestionably then "animal" health is an essential and inseparable part of "public" health. Yet of all the members of the health professions only two, veterinarians and pharmacists are, by their peculiar training, suited to and interested in the maintenance of good animal health. The specific training of each of these two is such

that, in their practice, they should complement each other — as do physician and pharmacist. In some areas a **modus vivendi** of this type has been evolved but, in general, our two professions have not yet begun to appreciate the mutual advantage of working closely together at the practitioners' level.

At the academic level for four or five years excellent co-operation has been in effect between Principal T. Lloyd Jones, the staff and students of the Ontario Veterinary College and the Dean, staff and students of the Faculty of Pharmacy, University of Toronto. We know that the understanding being developed at college will be carried over by the graduates as they enter actual practice. But we also feel certain that much greater co-operation than now exists can be effected at the local level by those already in practice.

Opportunity and Advantages of Co-operation

First let us scrutinize the two professions in respect to the specific types of service for which their education equips them.

Veterinarian. As you know better than I, the veterinary student receives a good grounding in the basic natural sciences and in the medical sciences such as biochemistry, microbiology, physiology, pharmacology, pathology, veterinary therapeutics and clinical practice. Consequently he is the only one qualified to diagnose disease in animals and to prescribe suitable treatment including medication. In addition certain types of treatment require his professional skill for administration. So, his basic role is a service function: to diagnose, to prescribe and to administer. I am sure you will agree that basically he is not an expert on drugs and chemicals, any more than is the physician. Consequently his primary role is not to supply drugs.

Pharmacist. The education of the pharmacist now requires four years after Grade XIII. The curriculum includes the basic sciences of: botany, zoology, comparative anatomy, physics, chemistry (inorganic, organic, analytical); the medical sciences: physiology, microbiology, biochemistry, pharmacology. There are also four required courses in pharmacy, three in pharmaceutical chemistry and two in pharmacognosy (plant and animal drugs) all of which concern drugs and chemicals used in medicine. In addition the retail pharmacist is required to take four courses in pharmacy administration and one course in "Animal and Plant Health", provided by the staff of the Ontario Veterinary College and the Ontario Agricultural College.

It is evident then that the pharmacist is the only member of the health professions who is an expert on drugs. In the words of W. A. Knapp, Jr., D.V.M., writing in **Southeastern Veterinarian,** No. 1, Fall, 1955: "many of us fail to appreciate that the pharmacy profession knows more about drugs, drug actions, toxicology, dosage and the business aspects of pharmaceuticals than any other profession." Is it not apparent then that the primary role of the pharmacist is as the supplier of drugs on the veterinarian's prescription and at the farmer's request. But he also is more and more suited to be a consultant on drugs for the veterinarian as he is for the physician, and, within limits, to the farmer, as he is to the general public. In no sense, however, is it his function to diagnose, or to prescribe, or to administer drugs for humans or for animals.

It would seem apparent then to one viewing the situation objectively that the logical respective roles are clear-cut and easily defined: the veterinarian diagnoses and prescribes, the pharmacist supplies the medication. But you and I both know that the problem is not so simple as that. We know there are economic and other pressures which are mitigating against the development of that logical idealistic state. Yet we cannot deny that when they do occur all of the irritations, the frictions and the antagonism have their basis in the pharmacist diagnosing and/or prescribing and in the veterinarian supplying medication on a large scale. Consequently I suggest that, with all good will, we should do our best to effect an improvement in the situation to bring us nearer the ideal relationship.

Let us see something of what our professions have at stake. Some time ago I read that in 1952 in the United States, the total value of livestock approximated $27,000,000,000.00.....The estimated loss through disease that year was $2,000,000,000.00 — about 7 per cent of the value. Yet the sale of animal health products to protect that investment was only $140,000,000.00 — about 0.5 per cent. It should be more and I believe would be more if our two professions co-operated fully at all levels.

Of considerable concern is the distribution of the $140,000,000.00 worth of animal health products: pharmacists 28.8%, veterinarians 28.2% — together just 57.0 per cent of the total. The balance, i.e. 43%, was distributed among non-professional groups: feeds stores 15.4%, hatcheries 10.3%, farm co-ops. 6.5%, others 10.8%. The sale through non-professional outlets was gaining ground, particularly feed stores and hatcheries, at the expense of the two professional groups. These are U.S. figures, but one doubts that the situation in Canada is appreciably different. In the best interests of animal health this should not be. It would not be, I am convinced, if our two professions had a close working relationship.

In 1953, Paul Wolfgang expressed it very well: " . . veterinarians and pharmacists are today at the point physicians and pharmacists were some 20 years ago. Physicians were dispensing and pharmacists were counter-prescribing . . . The manufacturer in the meantime was in the middle — the physician was annoyed if a manufacturer didn't sell him direct — the druggist was annoyed if the manufacturer did. Isn't the same situation essentially true in the field of animal health today? Many veterinarians don't like manufacturers who sell to druggists and many druggists resent manufacturers who sell veterinarians direct. In this field of animal health manufacturers are classified as "ethical" or "unethical" on the basis of sales policy. I violently object to this definition of "ethical" — veterinary medicine, pharmacy and pharmaceutical manufacturing are all highly ethical professions. Today in human health, physicians, pharmacists and manufacturers are working together. I don't mean to imply that animal health is 20 years behind human health but what I do mean is that in order to reverse this trend of sales away from the professions, and in the best interests of the future of animal health, we must all work towards the same type of three-way co-operation between the veterinarian, the pharmacist and the manufacturer."

I believe I am correct in saying that in order to reduce livestock losses it is important that the farmer be acquainted with the importance of animal health care. Am I naive to suggest that this be done best by the close co-operation of veterinarian and pharmacist in the community? A veterinarian has expressed it this way: "To realize the development of this great potential (i.e. the products and techniques to prevent and treat most ailments) demands the unselfish co-operation of the veterinary and pharmaceutical professions, and all professional tributaries thereof, in educating the farmer in the value of animal health care and to adequately, properly and promptly supply his animal health needs."

Towards Closer Co-operation

Mr. Chairman, an address such as this would have little value if it had nothing constructive to offer. Accordingly let us now consider several specific proposals which I believe are, in some measure at least, both feasible and desirable in order to promote closer co-operation between pharmacists and veterinarians at the "grass roots" level.

1. In his paper previously cited ("The Prescription, the Pharmacist and the Veterinarian"), Dr. Wm. A. Knapp has said, "the prescription is the key that will unlock the door" to close co-operation. In analogy he states, "the prescription is the life blood that nourishes the two professions" of medicine and pharmacy. Some of the advantages of prescription writing to the veterinarian are cited as follows:

(i) Prescribing brings to him a large number of pharmaceuticals which he does not have in his office. Therefore his choice of medication is not limited by what he has on hand.

(ii) The fee which he collects is, then, as it should be, solely for his services and knowledge. His net income should be higher because his fees can be nearly the same as when he supplied the medicine. One veterinarian reduced his drug account by nearly $3,000.00 in the first year by writing prescriptions and actually earned a higher net income.

(iii) Less money is tied up in drug inventory, and if the client does not pay his bill the cost of the medicines is not lost.

(iv) The prescribing veterinarian is more closely identified with the physician and consequently should gain in prestige.

(v). Practice in prescription writing is an excellent method to learn to appreciate drugs, their actions, indications and dosage. One who prescribes usually has more detailed information at his command concerning drugs than one who does not.

(vi) It helps to establish the type of relationship which should exist in all communities between pharmacist and veterinarian — where the pharmacist refers cases to the veterinary doctor certain in the knowledge that he will not lose, thereby, present and future sales, as the veterinarian writes prescriptions.

I am fully aware that there are various difficulties in the way of of "large animal" practitioners writing prescriptions for all cases. But, it is perfectly feasible, I am sure, for most of them to write many more than they do. Moreover, the small animal practitioner can do so on a large scale. The main point is that even writing a few shows evidence of good-will which can greatly improve relations.

2. Call on your local pharmacist and work out with him a plan of co-operation. If there are several, select one carefully. If he has not previously made a real attempt to serve the animal health needs, encourage him to become interested and to work with you. In any case, I suggest that you indicate clearly that you do not plan to supply all of your own drugs but would like him to carry stock to be ordered by you. Some of you I am sure have already evolved a very satisfactory local arrangement and can therefore testify respecting its success.

3. Much could be gained by occasional joint district meetings of our two groups—partly social, partly professional and scientific. I should like to see, too, veterinarians speaking at district pharmaceutical meetings and pharmacists speaking at district veterinary meetings. Even if nothing else were accomplished, such exchanges would be invaluable in developing a greater appreciation of the problems of the respective practitioners. Joint problems could be discussed in an atmosphere of cordiality and understanding. Each would truly look upon the other as a confrere, not a competitor. Each would come to recognize that there will be apparent overlapping in the two practices, but that much more will be gained by working together than by ignoring or working against each other.

4. I believe that the sales policy of certain companies selling veterinary preparations is doing much to perpetuate the competitive antagonism which exists in some areas. Yet I am also certain that those policies will not be changed until your group and ours demand it directly or indirectly. The first step to this end would seem to be the stopping of all group and individual boycotts of companies on a basis of sales policy. Is it too much to hope that pharmacy and veterinary medicine might join hands and say with one voice to all companies: "We shall buy from you only if you sell to both professional groups"? That would remove one of the cankers which is so irritating.

Conclusion

Mr. Chairman, I hope you agree with me that the development of close co-operation between our two professions is not only desirable but feasible and further, that such co-operation is important in the best interests of the livestock owner. If we are convinced that both professions have their particular roles to play we have made a vital start on our "adventure in understanding." If we take positive steps to correct misunderstandings and to work together at the local level, we are "over the hill". When we commence to work shoulder to shoulder at our district and provincial level, we have "burned our bridges" and must then move only onwards to greater and greater adventures and achievements as partners in animal health.

In a CBC play some years ago, Eric Linklater had one of the characters express the view that with "vision, desire and determination" any good might be achieved. Adlai Stevenson had this to say about vision: "What is vision? Is it not the ability to look beyond crowded landscape to the high hills where truth resides and new ages are coming to birth? Is it not the quiet voice of reason above the shouting of the haters?"

Will you, with me, have a vision like that? Will you nurture a desire to make it real? Will you work toward it with determination?

F. NORMAN HUGHES

FACTS WORTH REMEMBERING

Poison Bottles

One of the most interesting features to many young people in the Biology or Science course is the collection of specimens. Where insects are concerned, they have been generally killed in the so-called poison bottle where potassium cyanide is frequently used. We are all familar with the deadly nature of the cyanides in general, by ingestion, or by inhalation of the vapour.

It is a smiple matter today for the pharmacist to suggest the use of some other relatively innocuous substance to do the job, for example, D.D.T. in some form or other. A pressure bomb will do the killing if sprayed to replace the air in the bottle. Chloroform and Carbon Bisulphide may be used for the same purpose.

Metric Units of Drug Dosage

A recent Trade Information Letter from Dr. C. A. Morrell, Director of the Food and Drug Directorate, Department of National Health and Welfare, Ottawa, dated February 15, 1957, makes reference to a previous letter of October 3, 1955, No. 128 in which it was indicated that the continued use of two distinct systems of units for drug dosage may be a hazard to public health. A number of principles were outlined in this later submission and the Regulations have been amended to show the dosages in metric units. Attention is especially drawn to the following:

"NOTE: Accurate dosages may be expressed in either metric units or imperial units. If the dosage is expressed in both systems, then an approximation may be used for one expression, but such approximation must precede or follow the accurate statement by which the product will be judged and must be in brackets."

On the reverse side of the February 15th letter a table of typical approximate conversions from imperial to metric units is provided. The table appears to have the support of industry and is accepted by the Directorate for the uses indicated by the following recommendations:

(1) If the products are formulated in the metric system at present and labelled in metric units there should be no necessity to add an approximation in the imperial system.

(2) If drugs are formulated in the imperial system and labelled in the imperial units the metric approximation as contained in the table presented herewith should precede or follow the imperial units in brackets.

(3) When a manufacturer wishes to adopt the metric system as his primary standard it would be very helpful if he would refrain from making this change until he is ready to reformulate and manufacture a 300 mg. tablet, for example, instead of simply converting to the exact equivalent of 5 grains which would be 324 mg. In other words, at the end of the change-over it is hoped that there will not be tablets of 324 mg. or similar odd figures.

This change-over is expected to take a number of years and must be done gradually. It would be a mistake to convert everything to metric units except by addition of approximation at this time, or without reformulation to round numbers, but it is felt that the guidance given in this letter should prevent a number of problems occurring at a later date.

G. C. WALKER.

PRESCRIPTION PRICING AND COST ACCOUNTING

Many readers may have read my two articles in the Canadian Pharmaceutical Journal, **Prescription Pricing Methods,"** February, 1957, and **"Prescription Costs and Overhead"**, March, 1957. In one article I attempted to point up the common fallacy of basing prescription prices on cost of ingredients plus cost of container plus some percentage markup. This is a method of pricing merchandise ONLY and not a method of evaluating a prescription on the basis of professional skill and service. Because, in the United States there has been a considerable amount of literature on prescription **costing** eminating chiefly from Professor S. B. Jefferies of the Brooklyn College of Pharmacy, and because in Canada there has been considerable discussion of costs by the public, by some pharmacists, and by some provincial Health Departments (I was importuned a year ago to act as a consultant to one of them), I attempted in the second article to direct the pharmacist's thinking toward the meaning of cost and how to get at them.

Here, I would like to set forth some additional facts, ideas, and comments.

It would be worth while, I think, to review first Prof. Jefferies' "Universal Prescription Costing and Pricing Calculator". His suggestion is that there are four elements in cost (1) cost of ingredients; (2) cost of container; (3) direct labour cost; (4) overhead. He states that the first three are variables and must be calculated in each case, and the fourth is a constant and on his "calculator" he adds twenty cents a prescription as overhead. Two things are in evidence here. First, overhead is not a constant but can be made one, and second, when the pharmacist has added up these four elements he does not have a prescription price or fee but has only his cost, his out-of-pocket expenses. A professional fee for skill, training, and services must be added to this cost, the controversial question being, "How much should be added as professional fee?"

Standard Cost

Standard cost is a forecast or predetermination of what costs should be under projected conditions, serving as a basis of cost control, and as a measure of productive effiiciency when ultimately compared with actual costs. Estimated costs may refer to any prediction of cost without the discipline in its computation that usually attaches to standard cost. Hence, standard cost is a form of estimated cost but is different from the usual estimated cost since it is a carefully formulated advance estimate of what future cost should be under conditions expected to prevail. The present-day concept of a standard cost is a product of the scientific-management movement. The standard method of doing anything is simply the best method that can be devised at the time the standard is drawn.

Establishing Standard Costs

The essence of a standard-cost system is the existence of underlying physical standards which measure the amounts of materials, labour, and services which should be used. Dollar multipliers are then applied to the physical standards to obtain cost standards. Hence standards are established for:

1. Materials:—specifications covering kind, quality, and other characteristics. In a prescription, the physician specifies the materials to be used.
2. Labour:—methods and equipment used, operating time, using time and motion-study techniques to determine how long it should take to perform each operation when working under standard conditions. Qualifications, including training and experience, of the individual must be established. In dispensing a prescription, the minimum standards are set by law, that is, the dispenser must be a pharmacist.
3. Overhead:—these represent a variety of different items, many of which are difficult or impractical to measure closely. This usually leads to the expression of overhead standards in terms of dollar cost.

In costing a prescription, every pharmacist can easily determine material and labour cost. He knows the cost of the materials used and a stop-watch will determine the length of time taken to dispense each prescription. Knowing the wages he pays his pharmacist and the number of hours per week he is on duty he can easily figure his cost per minute. If the proprietor does the dispensing himself, the cost will be the same as that which he would have to pay someone else. Overhead, on the other hand, is more of a problem. The total for a given period, usually a year, is known from the accounting records. It represents all expenses minus direct labour cost. The method of allocating these expenses to different types of goods and different activities is the real problem.

Methods of Allocating Overhead

The method of spreading overhead is accomplished in industry in several different ways. The three chief ways are enumerated as follows:

A.—Direct Material Cost Basis

A ratio is made with overhead cost as the numerator and the direct material costs as the denominator.

Let us apply this formula to a pharmacy. Since the average pharmacy receives but 20% to 25% of its sales from prescriptions, we cannot take an average pharmacy as an illustration unless we have departmentalized records. This even would present some pertinent problems of its own in allocation of overhead to each department, including the prescription department, before we could start to allocate the prescription department overhead to individual prescriptions. For illustrative purposes, I have selected from my files, a pharmacy, not located in Ontario, which receives 86% of its sales from prescriptions. I have multiplied each figure by a factor so that not even the owner can identify it. Here is the data:

Annual Sales	$84,860
Prescription Sales	72,980
Cost of Ingredients and containers	40,140
Number of prescriptions dispensed	28,520
Total Expenses	31,645

Since non-prescription sales represent only 14% of total sales, we will more or less arbitrarily lop off 14% of the expenses from the total expenses and allocate them to the non-prescription sales. This will leave $27,215 as total expenses of the prescription department.

To arrive at overhead we must deduct the direct labour cost of filling 28,520 prescriptions. How will we do this? The Burley, Fisher, and Cox research on Drug Store Operating Costs and Profits in 12 pharmacies in the United States gave 6.9 as the median time for filling compounded prescriptions and 4.3 as the median time for filling dispensed prescriptions. We do not know what percent of the 28,520 prescriptions were compounded and what percent were dispensed. Further, Prof. Jeffries' **Universal Prescription Costing and Pricing Calculator** starts with a minimum of 8 minutes. Let us take then 8 minutes as the average time for each of the 28,520 prescriptions. This is 3,802 hours. And the wages of the pharmacist? Professor Jeffries uses 7 cents per minute or $4.20 per hour. This is obviously too high. The January, 1957 Practical Edition of the **Journal of the American Pharmaceutical Association** gives the present range of salary from $95 a week in Savannah, $100 a week in Boston, $125 a week in Detroit, $500 a month in Dallas, $125 a week in Cincinnati, to $150 a week in San Diego for a 40 to 48 hour week. We can safely use, I think 4 cents a minute or $2.40 an hour. We must deduct, then, $9,124 (3,802 hours at $2.40 an hour) from the total departmental expenses of $27,215 to get the prescription department overhead of $18,091.

Applying our formula of overhead as the numerator and direct material costs as the denominator we get:

$$\frac{\text{Overhead } \$18{,}091}{\text{Direct Material Costs } \$40{,}140} \text{ equals } \$0.45$$

for each dollar of direct material cost (ingredients and containers).

Next, let us apply the complete formula of ingredients, plus container, plus direct labour cost plus overhead to an average prescription of this pharmacy. The average cost of a prescription's ingredients plus the container is $1.40 ($40,140 divided by 28,520)

Ingredients and containers	$1.40
Direct Labour Cost (8 minutes times 4c)	.32
Overhead ($1.40 times $0.45)	.63
Total Cost	$2.35

We quickly see that this method of allocating overhead is simply adding a percentage of the ingredients cost as overhead. Also that this is COST ONLY. A professional fee must still be added in order to arrive at the price of the prescription to the customer.

B.—Direct Labour Cost Basis

Another method of allocating overhead is called the Direct Labour Cost Basis. The formula is to divide the Overhead by the Direct Labour Cost. Using the figures of our previous illustration:

$$\frac{\text{Overhead } \$18{,}091}{\text{Direct Labour Cost } \$\ 9{,}124} \text{ equals } 198\%$$

Costing the same average prescription:

Ingredients and container	$1.40
Direct Labour Cost (8 minutes times 4c)	.32
Overhead (198% of $0.32)	.63
Total Cost	$2.35

C.—Labour Hour Basis

A third method of allocating overhead is the Labour Hour Basis. The formula is to divide the Overhead by the number of direct labour hours per year. The formula is:

$$\frac{\text{Overhead } \$18{,}091}{\text{Labour Hours } 3{,}802} \text{ equals } \$4.76 \text{ per hour.}$$

Costing the same average prescription:

Ingredients and container	$ 1.40
Direct Labour Cost (8 minutes times c4)	.32
Overhead (8 minutes @ $4.76 per hour)	.63
Total Cost	$2.35

In these instances we have taken the **average prescription** and we find that the overhead works out to the same and total cost to the same figure no matter which one of the three methods we use for the allocating of overhead. However, this overhead figure is not a constant for all prescriptions, neither do all three methods of allocating overhead produce the same cost for prescriptions other than the average prescription.

Let us take $0.50 as the cost of the ingredients and container, keeping the same time element for dispensing and apply the three formulas.

	Formula A.	Formula B.	Formula C.
Ingredients & Containers	$0.50	$0.50	$0.50
Direct Labour	.32	.32	.32
Overhead	.23	.63	.63
Total Cost	$1.05	$1.45	$1.45
Ingredients & Container	$5.00	$5.00	$5.00
Direct Labour	.32	.32	.32
Overhead	2.25	.63	.63
Total Cost	$7.57	$5.95	$5.95

From these illustrations we see clearly that overhead is not a constant for all prescriptions. If method (A) is used the overhead is a percent of materials cost and is therefore variable, and if methods (B) and/or (C) are used it will vary according to the time required to fill the prescription.

In this next illustration we will keep the same costs of materials but vary the time element, that is raise the dispensing time to ten minutes:

	A.	B.	C.
Ingredients & Container	$0.50	$0.50	$0.50
Direct Labour	.40	.40	.40
Overhead	.23	.79	.79
Total Cost	$1.13	$1.69	$1.69
Ingredients & Container	$5.00	$5.00	$5.00
Direct Labour	.40	.40	.40
Overhead	2.25	.79	.79
Total Cost	$7.65	$6.19	$6.19

Since method (A) is virtually a scheme for adding a fixed markup to the cost of the ingredients, we see why this formula loads on too little overhead on prescriptions with small materials cost and too much on prescriptions with high materials cost.

In my opinion it is the use of this type of costing method, or pricing method in so many prescription pricing schemes that leads to first, the statement that the pharmacist is losing money on many prescriptions, and second, the charge, usually from consumers and manufacturers, that prescription prices are too high.

Whether formula (A), (B) or (C) is used, the pharmacist recovers all his overhead provided he has calculated his basic data correctly in the first place. This data, of course, is gathered from the financial statements and statistics of the previous fiscal period. It should be reviewed at the beginning of each fiscal period. If formula (A) is used ($18,091/$40,140 equals $0.45 or 45%) and in the new fiscal period prescription sales increase and hence the cost of materials, let us say to $50,000, while overhead of $18,091 remains the same, then the pharmacist is gaining since he is applying 45% of the material as overhead whereas the new ratio would be only 36%. On the other hand, if prescription sales take a drop to the point where cost of materials is only $30,000 and overhead of $18,091 remains the same then he continues to get 45% of materials cost as overhead while the new ratio is actually 60%. But if the dollar value of overhead and materials cost move in the same direction, either up or down, the distortions by using a formula calculated on performance of the previous period will be lessened.

If the ratio between overhead and material costs in formula (A) remain relatively the same the pharmacist recovers all his overhead but too little is recovered from the low material cost prescriptions and too much from the high material cost prescriptions. This is what gives rise to consumer complaints that prices are too high on the one hand, and the complaints of the pharmacist that prices are too low on the other.

Appraising formulas (B) and (C) again, we see that the pharmacist recovers all his overhead, providing his timing of the length of time taken to fill a prescription is correct and his overhead does not change materially during the fiscal period to which it is applied. These formulas are more scientific than (A) since it does not cost any more in direct labour cost or in overhead to fill a prescription for a dozen tablets costing 25 cents than a dozen tablets costing $2.00. One can anticipate the criticism here that there is a greater investment in inventory that should be compensated for. This is true but compensation for investment is a function of net profit and not a cost either in the language of the accountant or the officials of income tax departments.

If either of these formulas were used it would lessen the complaints of the consumer that prices are too high and the complaints of the pharmaceutical manufacturers that the pharmacist is "pricing himself out of the market." However, the pharmacist who finds himself in a community in which the doctors do the majority of their own dispensing and send only the prescriptions for expensive items to the pharmacist, will not be very happy. If his costing is correctly calculated, he will recover all his out-of-pocket expenses, and if he adds to his costs a fifty cent dispensing fee on each prescription, where

is the complaint? The complaint is that if he used the same formulas and dispensed ten times as many low priced prescriptions he would receive ten times as many fifty cent pieces. But because circumstances in his community prevent this, is it fair to the customer to load on a higher overhead by using formula (A)?

Distribution of Prescriptions by Price in Ontario

$1.00 or less 18%	$4.00 or less 87%
$2.00 or less 58%	$5.00 or less 93%
$3.00 or less 76%	$6.00 or less 95%

Over $6.00 - 5%

I think by now that we can see that overhead is not a constant as claimed by Professor Jeffries. All costs, in the long run, are variables. Professor Jeffries and Dr. George L. Secord, Chairman of the Interprofessional Relations Committee of the National Association of Retail Druggists, who prepared the N.A.R.D. Suggested Prescription Pricing Schedule, use $4.20 an hour as direct labour cost. Published evidence discloses that pharmacists receives no such compensation. No doubt this $4.20 will be defended on the grounds of idle time, and time spent in doing other things. This is true but it is just such charges that are included in overhead. To use $4.20 as the hourly rate for direct labour is to load part of the overhead into the direct labour charge to start with. There is not much point, in my mind, to putting part of the overhead in labour cost and calling it labour cost, and the balance in overhead and calling it overhead.

Both formulas (B) and (C) could be simplfied by adding the total overhead per prescription directly to the direct labour cost since the method of calculation of overhead in both cases is based on labour cost. In formulas (B) and (C) we could just as easily have said that a prescription may be properly costed, in our example, by adding to the cost of materials a direct labour charge for the time taken to fill the prescription of $7.16 per hour or 12 cents per minute. This 12 cents per minute would not be valid over long periods of time but would have to be calculated at least every year and of course it will vary from pharmacy to pharmacy.

When all is said and done, if your philosophy of prescription pricing is to be based on cost, it must be your cost and not somebody elses or an average constructed by someone from a number of pharmacies. Further, it must be remembered that what we have been talking about is costs not prices to the customer. The professional fee must be added in all cases to obtain a profit. When this has been completed you have simply used the philosophy of business to price a tangible object of production and trade much as you would expect a garage to price a repair job on your automobile, so much for parts used, so much for labour, plus so much for overhead.

On the other hand, if you conceive pharmacy to be a profession, and the compounding and/or dispensing of a prescription a personal service to a patient, your knowledge of **YOUR** costs is still essential but only as a management tool and as a measure of productive efficiency. Costs are only one element in the determination of the price of a prescription. The professional fee is of equal importance. This will be discussed in the next issue of the Bulletin.

H. J. FULLER.

CHROMATOGRAPHY and ION EXCHANGE

Part I. Chromatography

Chromatography is essentially a method of separation of mixtures based on the unequal affinities of the components to two phases, one of which is moving past the other. The principle of the process appears to impose no restriction as to the nature of the two phases or the types of equilibria involved in the separation. In practice, however, a liquid mobile phase and a liquid or solid stationary phase have been used in most applications.

Chromatography is divided into three general divisions: adsorption, partition and paper chromatography. These three processes have the same underlying principle based on the affinity of the various components of the mixture toward the phases used. The point of difference is the physico-chemical nature of this affinity.

Adsorption Chromatography

This process is based on the principle that some substances are adsorbed on the surfaces of others. The extent and strength of this adsorption depend of necessity on the nature of the adsorbing and adsorbed materials, assuming all other conditions are kept constant. If, therefore, two or more components of a mixture have different affinities toward a particular adsorbent, they can be separated from each other gradually by the use of a series of solvents of increasing polarity.

Alumina, calcium oxide, calcium phosphate, calcium carbonate, calcium sulphate, talc, lactose, silica and charcoal are but some of the most commonly used adsorbents in chromatography. The adsorptive capacities and specificities of these materials vary enormously, and are further influenced by the solvents used. Amongst the solvents commonly used are the following, named in an increasing order of polarity: light petroleum, carbon tetrachloride, cylohexane, ether, acetone, benzene, chloroform, alcohols, water at various pH values and pyridine.

A column of the adsorbent is packed homogeneously in a tube and a prewetting solvent, the same as that used in the mixture to be fractionated, is employed. The mixture is poured on the top of the adsorbent and by the choice of the proper solvent, the components of the mixture are washed slowly in the column. The components least readily or more weakly adsorbed will move down the column with the solvent (be eluted) more easily than those more firmly bound. In time, after the continual addition of solvent (eluent), the components of the mixture will be separated and will be located in different zones of the column.

Partition Chromatography

In partition chromatography, the concept of the distribution cofficient of a substance (i.e. the ratio of its concentration in two immiscible liquids at equilibrium) is employed. The process involves a series of continuous extractions. If the components of a mixture have different distribution coefficients between the immiscible liquids used, a gradual separation of these components can be achieved.

The stationary phase may be water, buffers or aqueous solutions of acids and bases properly distributed on a supporting column of, amongst others, silica, Kiesulghur, starch, powdered cellulose, charcoal or Silicic acid. The mobile phase is usually a water-immiscible solvent. Occasionally, the phases are reversed, the water-immiscible solvent being supported on the column and the relatively more polar solvent used as eluent.

Paper Chromatography

This is partition chromatography on paper. The supporting column in this case is filter paper on which is placed a drop of the mixture to be fractionated. The end of the filter paper, near the spot, is inserted in a trough containing the immiscible liquid saturated with water and the whole assembly is enclosed in a suitable chamber whose atmosphere is saturated with the vapours of the water and the solvent. After the solvent has flowed a suitable distance down the paper, the position of the solvent front and the components of the mixture are determined. These components are then identified by their characteristic R^F values, R^F being the ratio of the distance moved by the solute to that moved by the solvent.

Among the most important modifications in paper chromatography is the one involving development by an ascending flow of the solvent instead of a descending flow. Also, the filter paper may be impregnated with various substances to modify the properties of the stationary phase.

Applications of Chromatography in Pharmacy

The fact that chromatography is usually applicable to small quantities of the sample, and that the components of the mixture are normally not changed during separation, makes chromatography extremely valuable as a process of extraction and separation. Its applications in pharmacy, as well as in many other fields, are very extensive so that only a brief indication of its scope can be given here.

Chromatography has been used for:

1. The determination of homogeneity of substances which may be contaminated by chemically similar material, such as steroids, lipoids, alkaloids and cardiac glycosides.
2. Comparison of substances suspected of being identical.
3. Removal of contaminants from impure samples.
4. Qualitative and quantitative analysis of various pharmaceutical preparations containing vitamins, etc.
5. Separation of different types of penicillin, estrogenic materials, antihistamines, sulfa drugs, organic acids, antibiotics, etc.
6. Determination of individual components of complex mixtures such as hyoscine and hyoscyamine in solanaceous drugs.

L. N. ELOWE.

SURVEY OF SALARIES OF GRADUATES IN ONTARIO

While the number of replies, 63, to the questionnaire appearing in the November, 1956, issue of the Bulletin, was not large, they represent approximately 6% of the total number of graduates employed in retail pharmacies in Ontario. The total number of other graduates employed in the same pharmacies was 59. Hence, assuming no duplications from the same pharmacies, and assuming no great salary differential among the graduates employed in the same phar-

SURVEY OF SALARIES OF GRADUATES IN ONTARIO

Number of Graduates; hours per week in brackets

Population Size

Weekly Reported Salary	Annual Rate	Below 25,000	25,000 to 50,000	50,000 to 100,000	100,000 to 200,000	200,000 to 500,000	Toronto	Ontario	Aver. Hrs. by Salary Classification
$170.00	$8,840						1 (60)	1	60
125.00	6,500		1 (44)		1 (51)			2	48
115.00	5,980			1 (40)			1 (41)	2	41
112.00	5,824		1 (56)					1	56
110.00	5,720			*2 (42,45)	1 (42)	1 (48)		4	44
105.00	5,460	1 (40)		**	1 (42)		1 (49)	3	44
100.00	5,200	2 (38, 47)	2 (44,48)	1 (48)	*6 (40,40,40 ** 44,46,54)	*2 (43,43) **	*4 (40,42, 45,48)	*17	44
97.00	5,044						1 (42)	1	42
95.00	4,940	1 (48)		1 (40)			**3 (45,50, 51)	**5	47
92.50	4,810				1 (40)		1 (48)	2	44
92.00	4,784						1 (40)	1	40
90.00	4,680		**1 (60)				1 (39)	2	50
87.50	4,550		1 (48)			1 (42)		2	45
85.00	4,420	**2 (47, 50)	2 (42,47)				3 (43,43, 56)	7	47
82.00	4,264						1 (37.5)	1	37.5
80.00	4,160	1 (48)	1 (44)		1 (40)		1 (48)	4	45
75.00	3,900	*4(48,48,48,49)	1 (44)				2 (41,48)	7	47
68.00	3,536	1 (48)						1	48
Totals		12	10	5	11	4	21	63	
Aver. Weekly Salary		$84.83	$93.95	$106.00	$101.13	$99.37	$95.85	$95.40	
Annual Salary Rate		$4,411	$4,885	$5,512	$5,258	$5,167	$4,984	4,960	
Aver. hrs. per week		(46.5)	(48)	(43)	(44)	(44)	(46)	(45.4)	
*Mode								(48)	
**Median								(45)	

macy, the salary schedule represents 122 pharmacists or better than 10% of the graduates in Ontario. The number of pharmacies in the 20 communities reporting total 1,178 or approximately 60% of the total number of pharmacies in Ontario.

The following is the distribution of the replies. There was some indication that several of the replies may have been post-marked other than the community in which the pharmacist is employed.

Belleville	1	Nippon	1	St. Thomas	2
Brantford	1	Orillia	2	Stratford	1
Brockville	1	Ottawa	2	Sudbury	4
Guelph	1	Owen Sound	1	Toronto	21
Kingston	2	Peterborough	1	Windsor	7
London	4	Port Hope	1	Woodstock	2
Niagara Falls	3	St. Catherines	3		
				Total	63

The accompanying chart classifies the replies according to population size. The bracketed figures are the number of hours per week; *represents the mode or salary which occurs most frequently in each group; and the double **represents the median or the salary that is in the middle of the series.

The mode or salary that occurs most frequently among the 63 replies is $100 a week, and 30 or 47% of those reporting receive this salary or better. Also, there are 27 other graduates employed in the same pharmacies that employ the 30 reporting salaries of $100 a week or more, hence it is most likely that the percentage receiving $100 a week or better may approximate 60%.

Holidays With Pay

3% receive three weeks; 84% receive 2 weeks; 6% receive 1 week.

Other Benefits

Other benefits paid for all or in part by the employer, range from Blue Cross, group insurance, pension plan, to profit sharing. Forty-five percent of those replying report other benefits of some kind. Employers outside of Toronto seem to be the most progressive in this regard. Only 28% of the Toronto replies report "other benefits" while 52% of the replies from other communities report "other benefits".

If we assume that other graduates employed in the same pharmacy as the person who filled out the questionnaire receive not less than the person reporting we get a different salary pattern:

Population	Average Salary
Below 25,000	$ 85.00 per week
25,000 to 50,000	$ 95.00 per week
50,000 to 100,000	$108.00 per week
100,000 to 200,000	$104.00 per week
200,000 to 500,000	$102.00 per week
Toronto	$ 92.50 per week

H. J. FULLER

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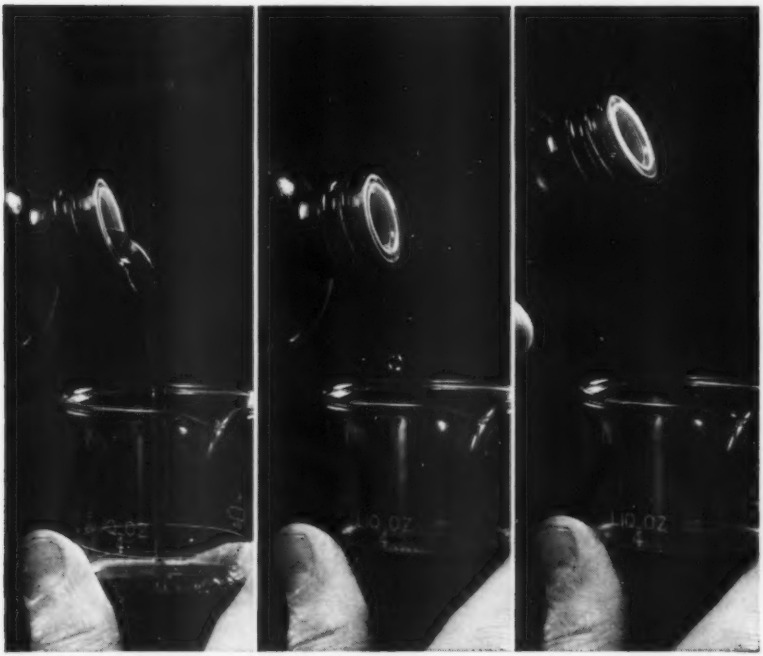

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(1) Winton, S.S. & Cheserow, E., "A clinical study of combined chemotherapy".

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